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Valvular and Congenital Heart Disease

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Valvular Heart Disease

Aortic Valve Disease

Aortic stenosis. Aortic stenosis usually results from a congenital or a degenerative process. In the elderly, an ejection systolic murmur, a fourth heart sound and left ventricular hypertrophy commonly occur from causes other than aortic stenosis. Various combinations of these findings frequently pose a diagnostic dilemma. Clinical evaluation (including electrocardiography [ECG] and chest X-ray film) and, if necessary, Doppler echocardiography are often sufficient to exclude aortic stenosis or to ascertain that aortic valve obstruction is only mild in severity. If the findings are equivocal and if the patient is symptomatic, cardiac catheterization and angiographic studies may be needed.

Severe calcific aortic stenosis is the most common valvular lesion that requires valve replacement in the elderly (1). Its clinical presentation in the elderly is often different from that seen in younger patients (2): 1) About 20% present in heart failure; 2) about 20% have significant systemic arterial hypertension; 3) the peripheral (carotid) pulse contour may be rapid rising; and 4) the murmur may be soft and atypical in sound and location. Despite the advanced age of these patients, only one-third have abnormal left ventricular systolic function and one-half have significant associated coronary artery disease (2).

Because patients with severe aortic stenosis usually have an excellent result from surgery, even with a reduced preoperative left ventricular ejection fraction, it is important to recognize the disorder even in atypical cases and to assess its severity. Doppler echocardiography is of particular value.

Aortic regurgitation. Aortic regurgitation may result from a congenital valve abnormality, myxomatous degeneration, systemic arterial hypertension, rheumatic heart disease, infective endocarditis and other conditions. Infective endocarditis must be considered with recent onset aortic regurgitation and may also cause advanced atrioventricular (AV) block. Diagnosis is usually not difficult, but in many elderly patients some peripheral signs are mimicked by a rigid arterial system. Echocardiography, with or without Doppler ultrasound, is of value in confirming that the lesion may be only mild to moderate in severity and in diagnosing and evaluating the etiology of the lesion and associated diseases of the heart. Assessment of left ventricular function is essential in all patients with severe aortic regurgitation to identify candidates for valve replacement (1). In asymptomatic patients with severe aortic regurgitation, it is important to objectively document the exercise capacity.

Mitral Valve Disease

Mitral stenosis. Mitral stenosis usually results from rheumatic fever. It can result from mitral anulus calcification in the elderly but is not a common disorder. Diagnosis and management in the elderly are similar to those in the younger age group.

Mitral regurgitation. Proper closure of the mitral valve is the result of integration of normal function of the left ventricle, papillary muscles, chordae tendineae, mitral valve leaflets, valve ring and synchronized AV contraction. At all ages, mitral regurgitation may result from dysfunction of any one or more of these components of the mitral valve. In the elderly (3), three causes of mitral regurgitation that deserve special consideration are coronary artery disease and its complications and two degenerative processes, myxomatous degeneration of the mitral valve cusps that results in mitral valve prolapse and mitral anulus calcification. Rupture of the chordae tendineae occurs in association with both of the latter conditions, as well as in isolation. Mitral anulus calcification is a pathologic entity that occurs predominantly in the elderly (4). It may produce no hemodynamic abnormality or occasionally may produce obstruction to left ventricular inflow; when mitral anulus calcification causes valvular dysfunction, it usually results in mitral regurgitation and is associated with an increased incidence of conduction abnormalities.

The diagnosis of mitral regurgitation can usually be made clinically. M-mode and two-dimensional echocardiography are of value in providing clues about the etiology, in assessing the size and function of the left ventricle and in diagnosing associated conditions. Doppler echocardiography is of value for the diagnosis of the difficult case and may be of value in quantification of the regurgitation. Assessment of left ventricular function is essential in all pa-

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tients with severe mitral regurgitation to identify candidates for valvular surgery. In asymptomatic patients with severe mitral regurgitation, it is important to objectively document the exercise capacity; in addition, assessment of left ventricular systolic function may importantly influence decisions regarding operative intervention. Symptomatic patients with mild to moderate mitral regurgitation may require hemodynamic studies with exercise to identify the development of pulmonary venous and arterial hypertension.

Indications for Valvular Surgery

The indications for valvular surgery in the elderly are generally similar to those at a younger age. The valvular lesion must be severe and the patient must be symptomatic. Exceptions include many patients with severe aortic stenosis, those who have deterioration of left ventricular function and those undergoing open heart surgery for other reasons such as coronary artery bypass procedures for angina; in these instances, patients may be asymptomatic from their valvular disease, but the valvular lesion must be severe.

Factors that increase the operative mortality and reduce the beneficial effects of surgery include 1) the severity of ventricular dysfunction; 2) inoperable coronary artery disease; 3) moderate to severe heart failure; 4) pulmonary hypertension; 5) other associated disorders such as obstructive lung disease, renal failure, peripheral vascular disease, renovascular disease and carotid artery disease; 6) the overall psychologic and functional status; and 7) the nutrition of the patient. Associated conduction abnormalities of the heart are not uncommon and do not appear to alter the natural history but may require permanent pacemaker implantation.

Most elderly patients will require selective coronary arteriography and cardiac catheterization and angiography before valvular surgery (5). Selective coronary arteriography can identify the need for concomitant coronary bypass surgery or the presence of inoperable coronary artery disease and its attendant increased surgical risk.

In evaluating the elderly patient for valvular surgery, the physician must consider the patient's physiologic and psychologic age rather than just chronologic age. The selection of a surgeon with extensive experience in valvular surgery also contributes to a good outcome.

Valvular Surgery

Valvular surgery can be undertaken in the elderly at a slightly higher risk than in a younger age group (6). Adverse factors described above are more common in the elderly and increase the risks proportionately.

Choice of valve prosthesis. *When feasible, valve reparative procedures should be performed.* The choice of a prosthetic valve is dependent on many factors. At first glance, a bioprosthetic valve may be highly desirable in the elderly, because anticoagulant therapy may be avoided; also, because elderly patients have a shorter expected survival, bioprosthetic valve degeneration may be less of a problem. On the other hand, many elderly patients live ≥10 years after valve surgery; the prospect of reoperation for bioprosthetic valve degeneration in patients in their 80s is not attractive (1). Additionally, many elderly patients are small and require a smaller size valve prosthesis; in these sizes, bioprosthetic valves are inherently significantly stenotic. Moreover, many elderly patients may need anticoagulant therapy for other reasons. The choice of an appropriate valve replacement device requires experience and judgment.

Balloon valvuloplasty. Catheter balloon valvuloplasty for treatment of mitral and aortic stenosis is an exciting new technique (7,8). It is in the early stages of development and at present is in the stage of clinical investigation (9).

Congenital Heart Disease in the Elderly

Recognition that heart disease in an elderly patient is secondary to a congenital abnormality requires its consideration (10). With increasing awareness of this possibility and with the availability of noninvasive imaging of cardiac anatomy, diagnosis of congenital heart lesions can now be made with greater facility.

Many congenital cardiac lesions cause sufficient hemodynamic problems that diagnosis is made early in life and the patient surgically treated. Other congenital cardiac lesions cause such severe hemodynamic disturbances that, without surgery, the patient will not survive to reach the geriatric age group. On the other hand, congenital cardiac lesions resulting in little hemodynamic disturbance early in life, such as bicuspid aortic valve, may cause serious problems late in life.

Unoperated congenital heart disease in the elderly patient. Only a few hemodynamically significant congenital lesions are seen in elderly patients: atrial septal defect; persistent ductus arteriosus; and occasionally Ebstein's anomaly. The diagnosis can usually be made by clinical examination, including an ECG and chest X-ray films. In symptomatic patients, these lesions can be repaired at a slightly higher risk than in younger patients with good symptomatic improvement. Even in asymptomatic elderly patients, evidence of cardiovascular dysfunction may be an indication for surgery.

Problems in patients who have had surgical correction of congenital heart disease. Such patients are just now reaching the geriatric age group. These patients have problems such as arrhythmias, conduction defects, ventricular dysfunction and residual valvular regurgitation and obstruction, whose frequency and severity are not yet fully defined. The full impact of these lesions is not yet known. For example, arrhythmias and right ventricular dysfunction seen in adults after surgical correction of tetralogy of Fallot may be accentuated with survival to old age.

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Infective Endocarditis

Clinical features. Patients with valvular and congenital heart disease are at risk for the development of infective endocarditis. Although the clinical features may be similar to those present in the younger age group, in the elderly the clinical picture is more likely to be obscure or atypical (11). The patient may be asymptomatic or have symptoms suggestive of other disorders. Presenting symptoms are often vague or nonspecific, for example, anorexia, nausea and vomiting; fever may be present in only one-half of the patients. In others, the presenting symptoms of disorientation or neurologic complaints may be mistakenly considered part of normal "aging" or attributed to other disease processes that also cause anemia or azotemia. In the elderly population, there is a higher incidence of infective endocarditis due to *Streptococcus bovis* related to gastrointestinal disorders; and to *Enterococcus*, probably related to a higher incidence of genitourinary procedures in elderly men. The blood cultures may be negative in some patients. The high mortality rate of infective endocarditis in the elderly is probably related to the late diagnosis and, thus, late treatment of the disorder.

Prosthetic valve endocarditis. The incidence of prosthetic valve endocarditis is about 3% in the first year and 0.5%/year thereafter. Even in old age, the patient with a prosthetic heart valve can never be considered free of the risk of developing infective endocarditis. The spectrum of the organisms responsible for prosthetic valve endocarditis is changing (12). Early prosthetic valve endocarditis (≤2 to 12 months after valve replacement) usually results from "hospital-based" organisms, for example, the staphylococci are methicillin resistant.

Prophylaxis. Antibiotic prophylaxis for prevention of native and prosthetic valve endocarditis is essential in elderly patients. The recommendations of the American Heart Association are considered the standard of practice in the United States (13). There is no consensus as to whether aortic sclerosis or mitral annular calcification without regurgitation requires prophylaxis against infective endocarditis.

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